AMERICAN DYNAMICS™

EDVR

EDVR Calculator User Guide

Version 1.0

tyco / Fire & Security

Part Number 8200-0826-01 AO

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American Dynamics

6795 Flanders Drive

San Diego, CA 92121-2903 U.S.A.

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1. Introduction

The Calculator utility is a companion for American Dynamic's Embedded Digital Video Recorder (EDVR). The purpose of this utility is to assist users in estimating how much record time is attainable in their EDVR systems with a known hard disk drive (HDD) size. It can also be used to estimate how much hard drive space is needed for a target recording duration.

The user is advised to go through Sub-sections 4 Alarm Record Rate and 5 Alarm Record Mode on pages 48 and 49 of the **Installation and Operation Guide v1.54** (and later), for a full explanation of the topics. Releases prior to this version do not contain adequate information in these areas. These sections form the basis of the computation algorithm detailed in Section 4 of this Calculator User Guide.

It is important to note that, starting from v1.54, the User's Guide no longer contains the Possible Recording Time Tables. The tables previously released in v1.44A and v1.53A contain errors and should no longer be used. They are corrected and included in this document as sections 5 and 6 respectively. The table in section 6 is applicable to v1.53A and all later releases.

Note

The compression rate of STANDARD in v1.53A and up corresponds to that of BASIC in v1.44A. A higher compression rate is used in BASIC of v1.53A and up. This change enables longer recording time when the camera quality and image contents give acceptable recorded image quality.

2. The Calculator Utility

General Information

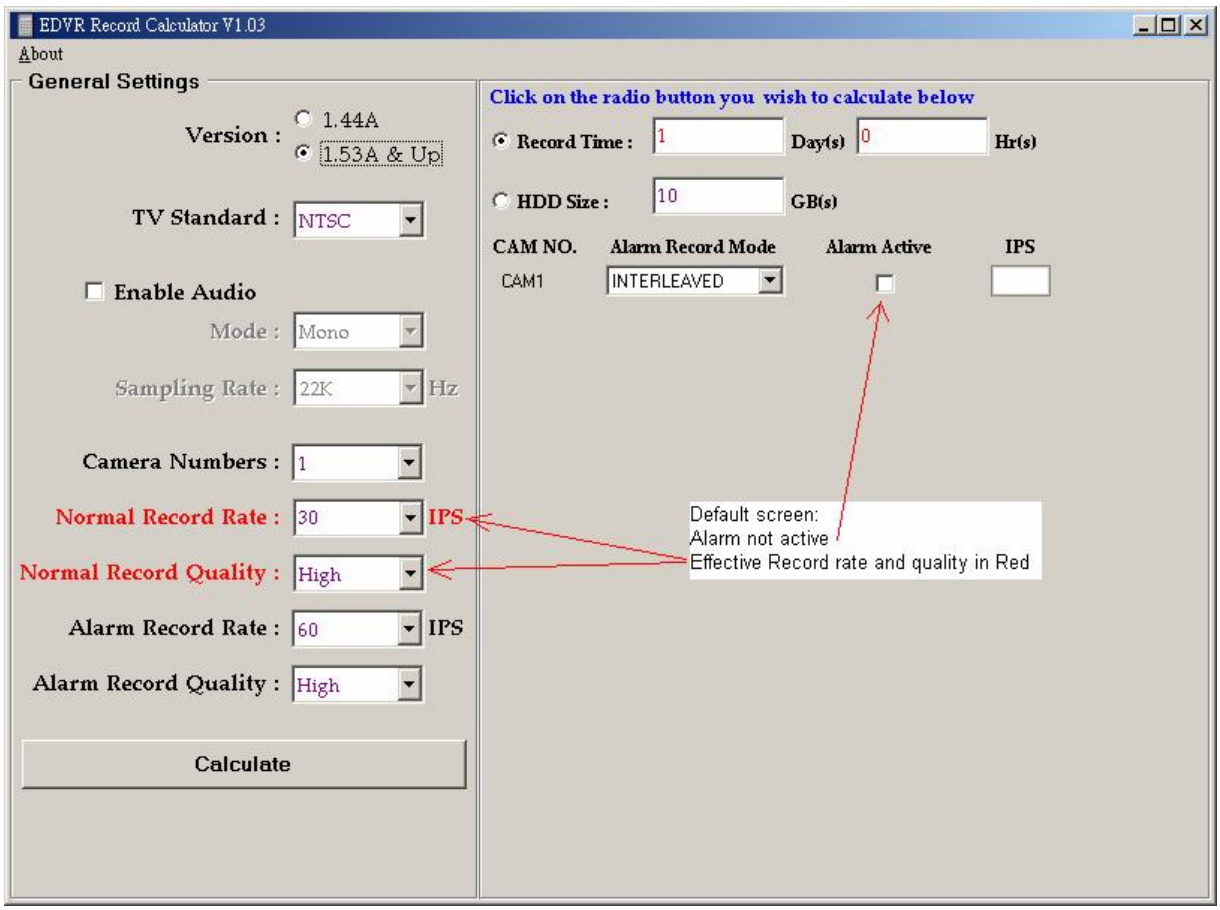
- Applicable to FW v1.44A or 1.53A and up.
- On the User Interface, red text highlights fields which are automatically selected or calculated.
- Calculate either record time on 10 GB HDD, or the HDD size to be consumed after 1 day of recording.
- Calculate recording time/HD size in the presence or absence of audio.
- Calculate recording time/HD size when alarm is either active or not.

Known Limitations

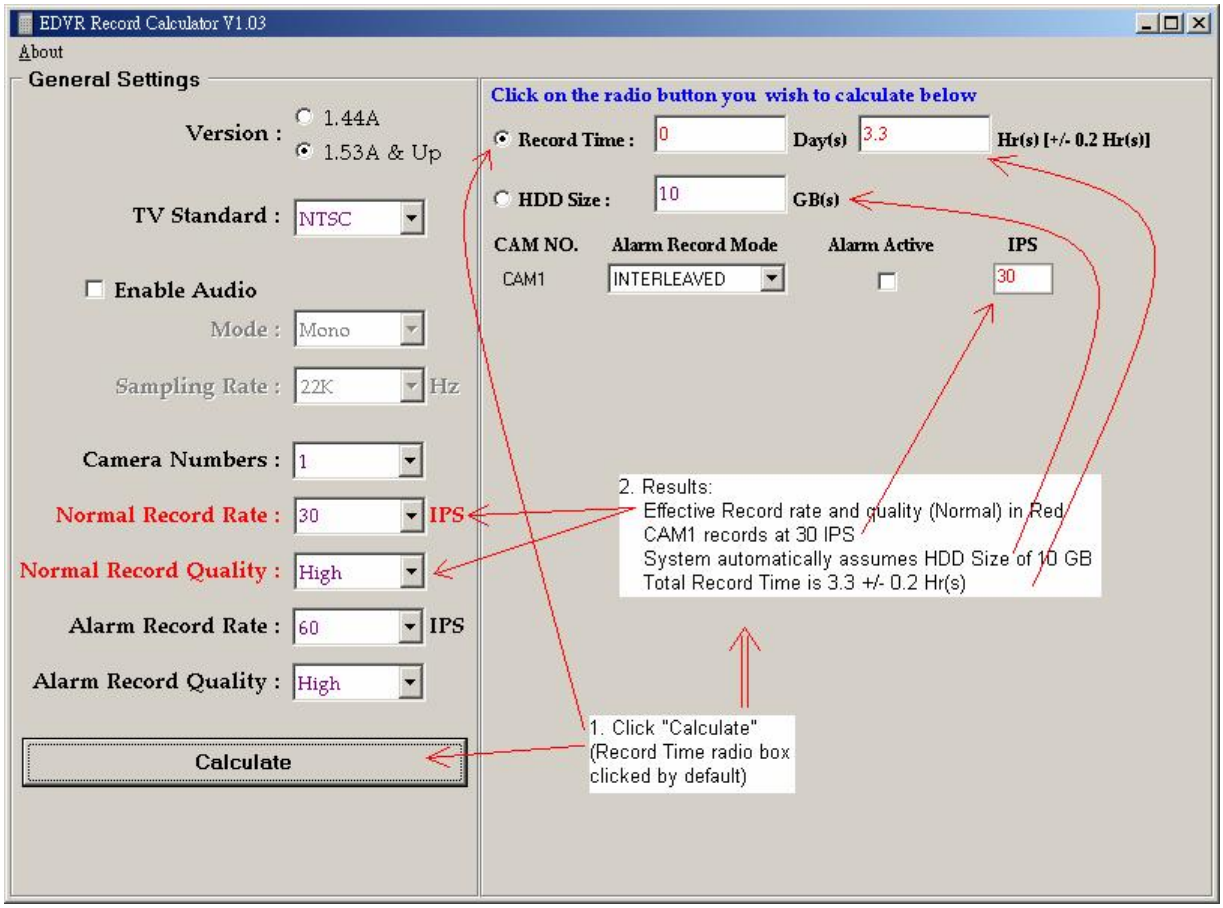
Issue	Description
One quality setting applies to all channels.	EDVR provides options to set each channel's record quality at 4 different levels of recording image; the EDVR Calculator v1.03 only supports one global setting of record quality.
Under a special condition, the Record Time computed by the Calculator cannot be reached by the EDVR. This is a limitation of the EDVR rather than the Calculator.	When 4 cameras are present, and alarm recording is triggered in a single camera set up at Exclusive or Interleave alarm mode, the alarm camera will be the only one recorded for the alarm duration. If the alarm record rate is set at equal to or greater than the maximum rate allowed (30 images per second (IPS) for NTSC and 25 for PAL), this camera is expected to record at the maximum allowed rate from the computation of Calculator v1.03. In fact, the system will not be able to achieve this maximum record rate. Depending on the content of the images, the actual rate can be 3 to 5 IPS lower than the maximum. This translates into 25-27 IPS for NTSC and 20-22 IPS for PAL.

How To Read The Screen

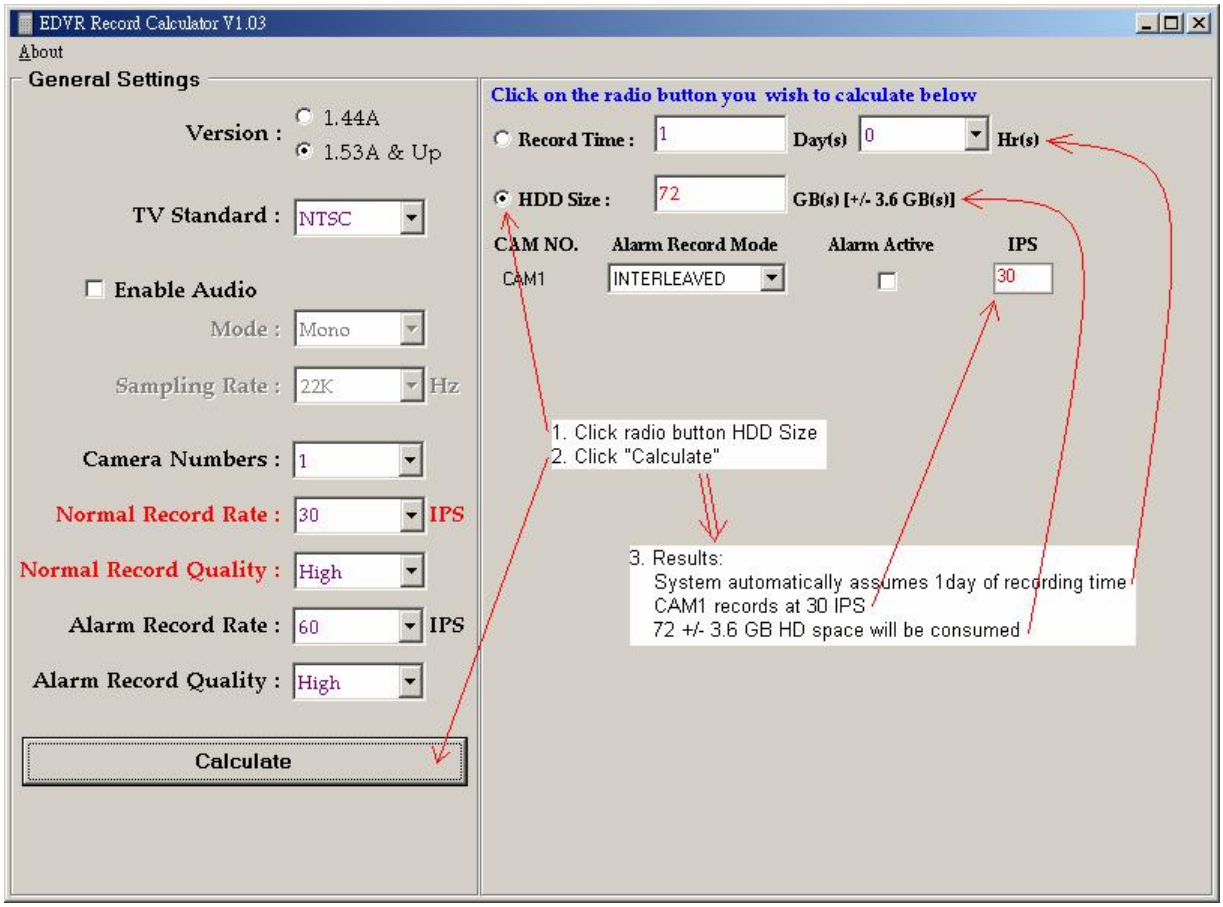
1. Default screen.



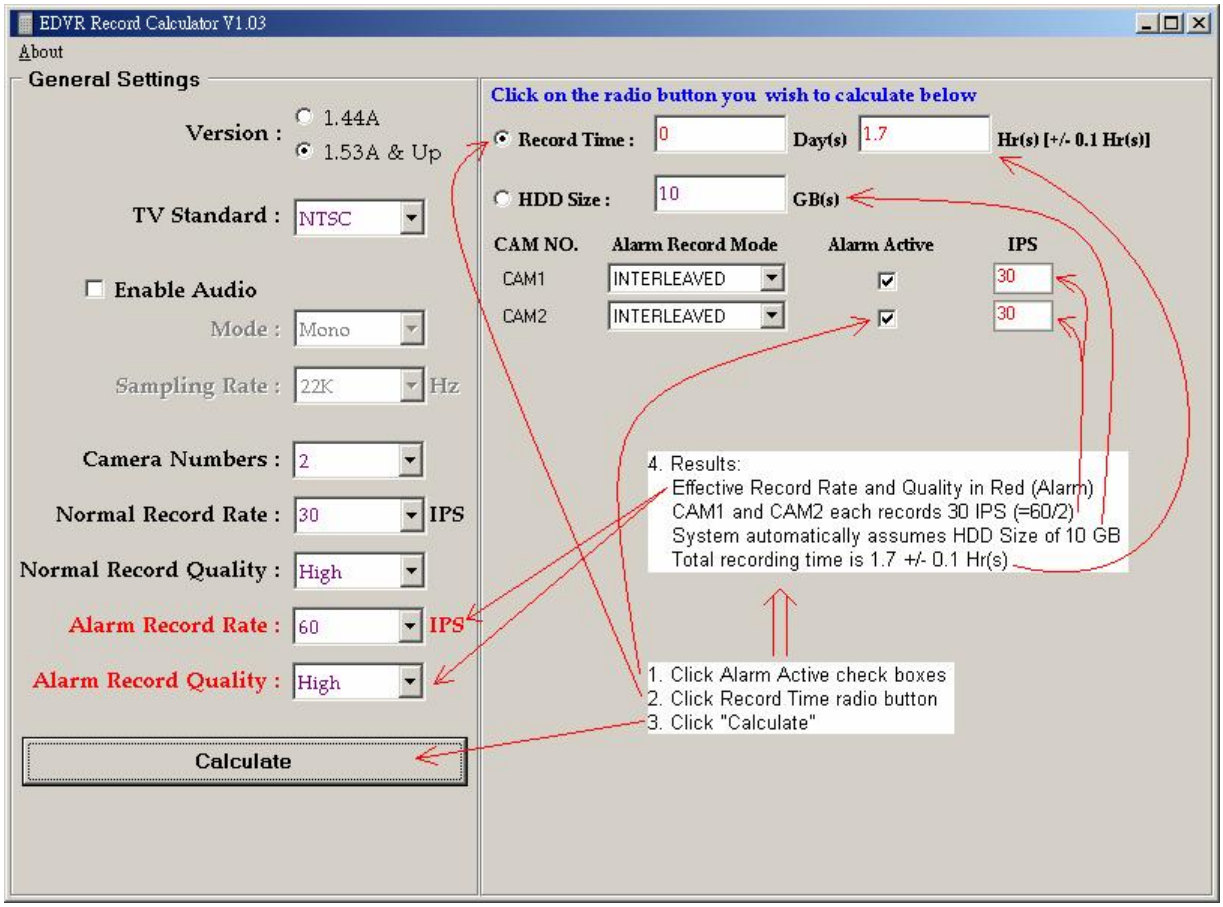
2. Calculate Record Time on a 10 GB hard drive.



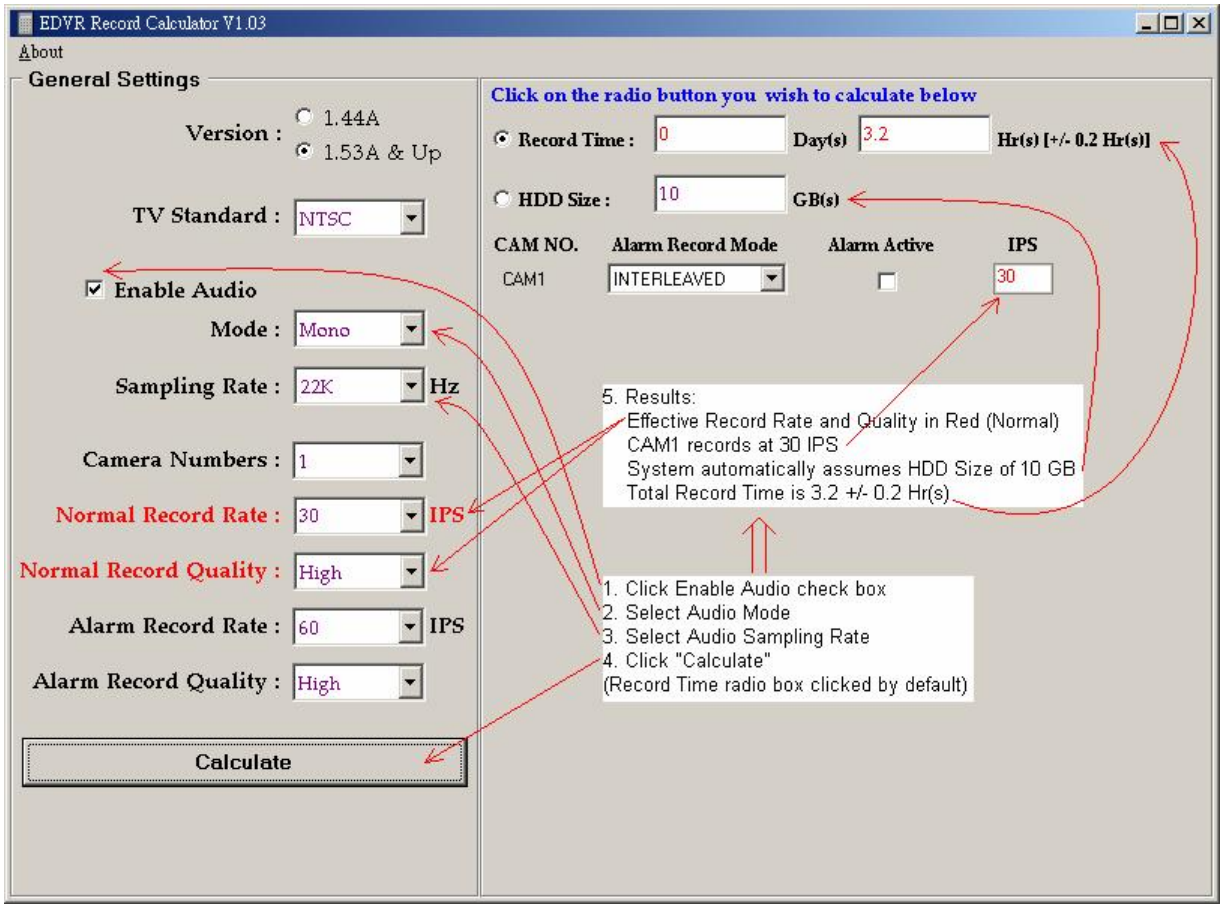
3. Calculate hard drive size needed for 1 day of Record Time.



4. Calculate Record Time when alarm is active.



5. Calculate Record in the presence of audio.



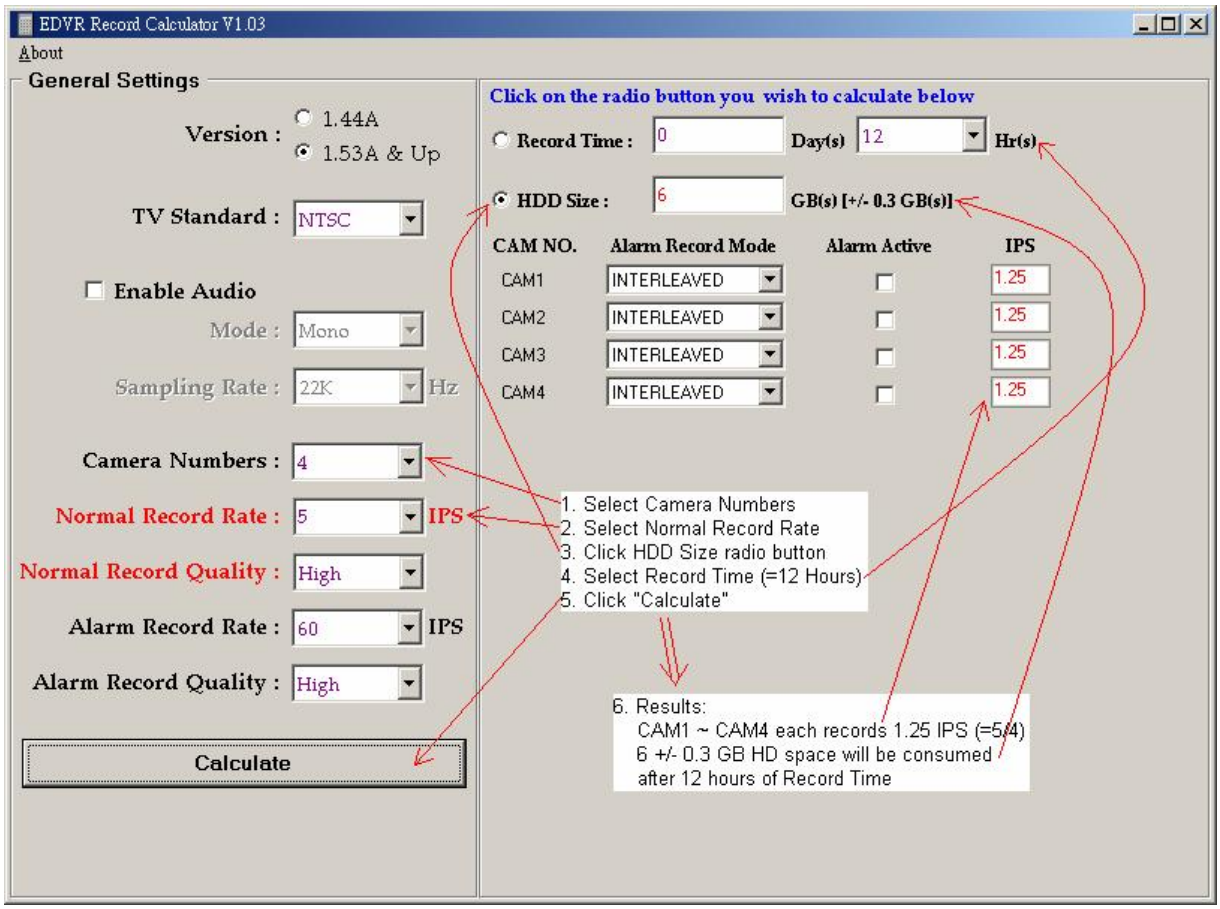
Example - Scenario 1

I have a system of 4 cameras on NTSC and no audio. I have the following setup:

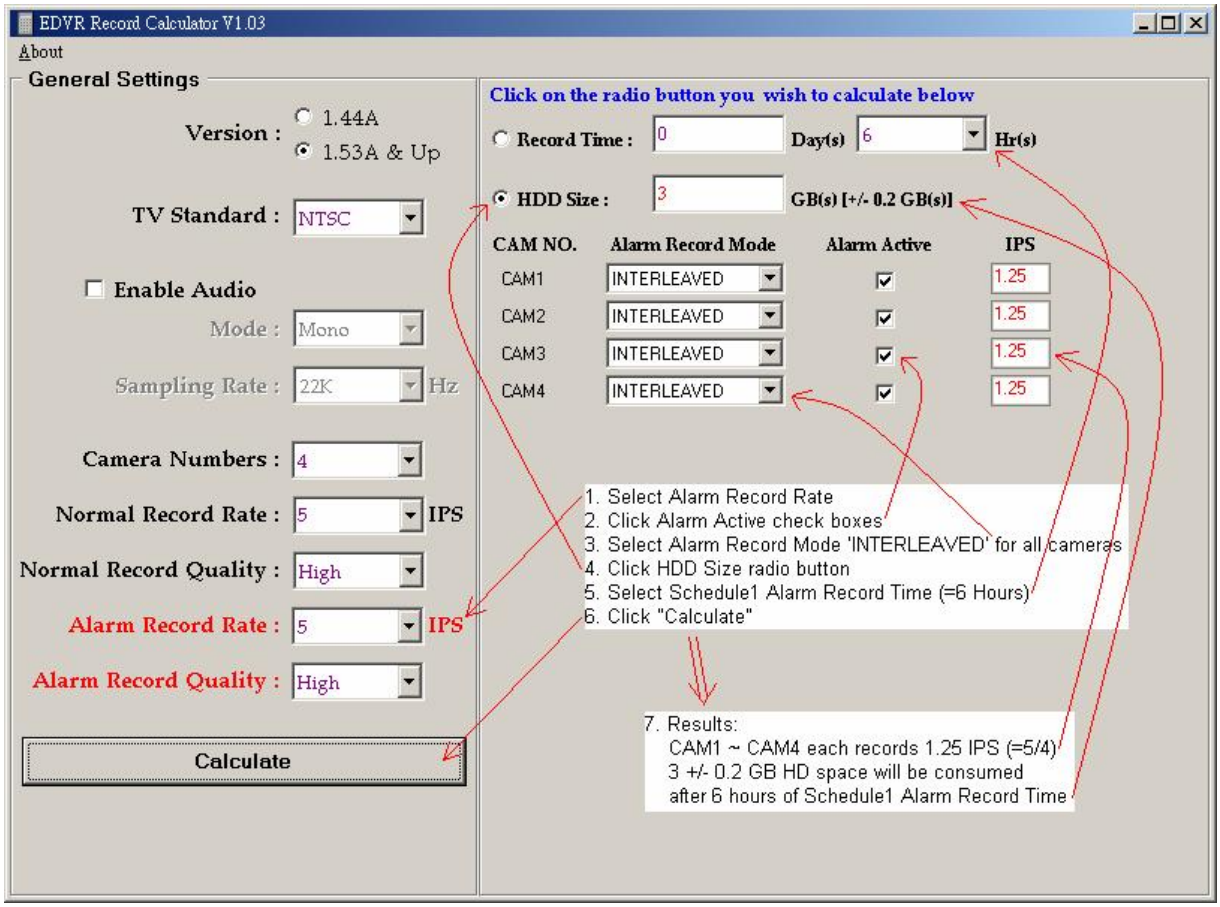
- Normal record at 5 IPS
- Schedule1 for 12 hr of recording on alarm trigger at alarm record rate 5 IPS
- Schedule1 alarms are all set to Interleave mode.

How do I use the Calculate function to figure out the record time on a 160 GB hard drive, assuming 50% (6 hr) of the Schedule1 duration is in alarm-triggered recording?

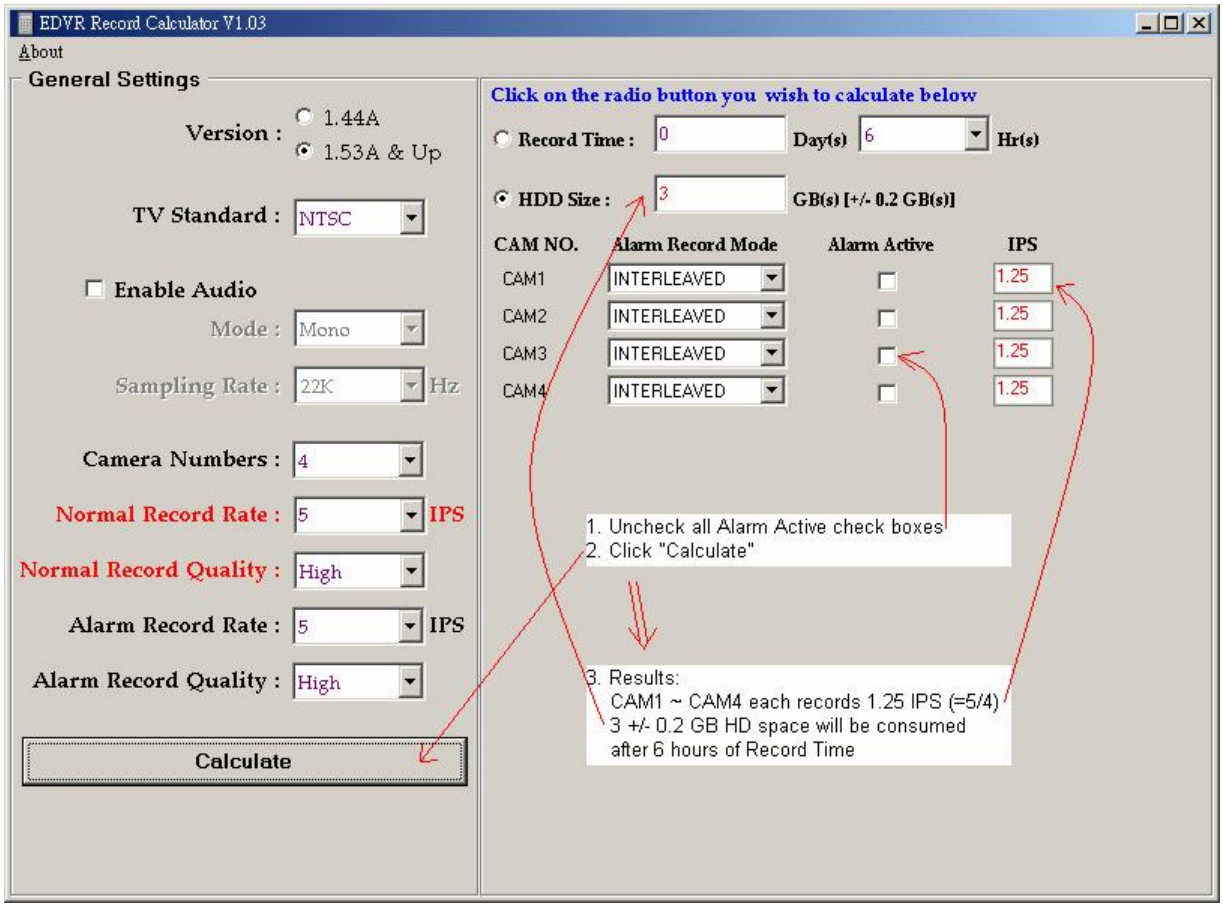
1. Normal Record Mode: Estimate HD space needed for 12 hours of normal recording.



2. Schedule1 Alarm Record Mode: Estimate HD space needed for 12 hours of alarm recording at 50% of the time, or 6 hours (continued from the last section).



3. Schedule1 Normal Record Mode: Estimate HD space needed for the other 50% of time (6 hours) when alarm is off (continued from the last section).



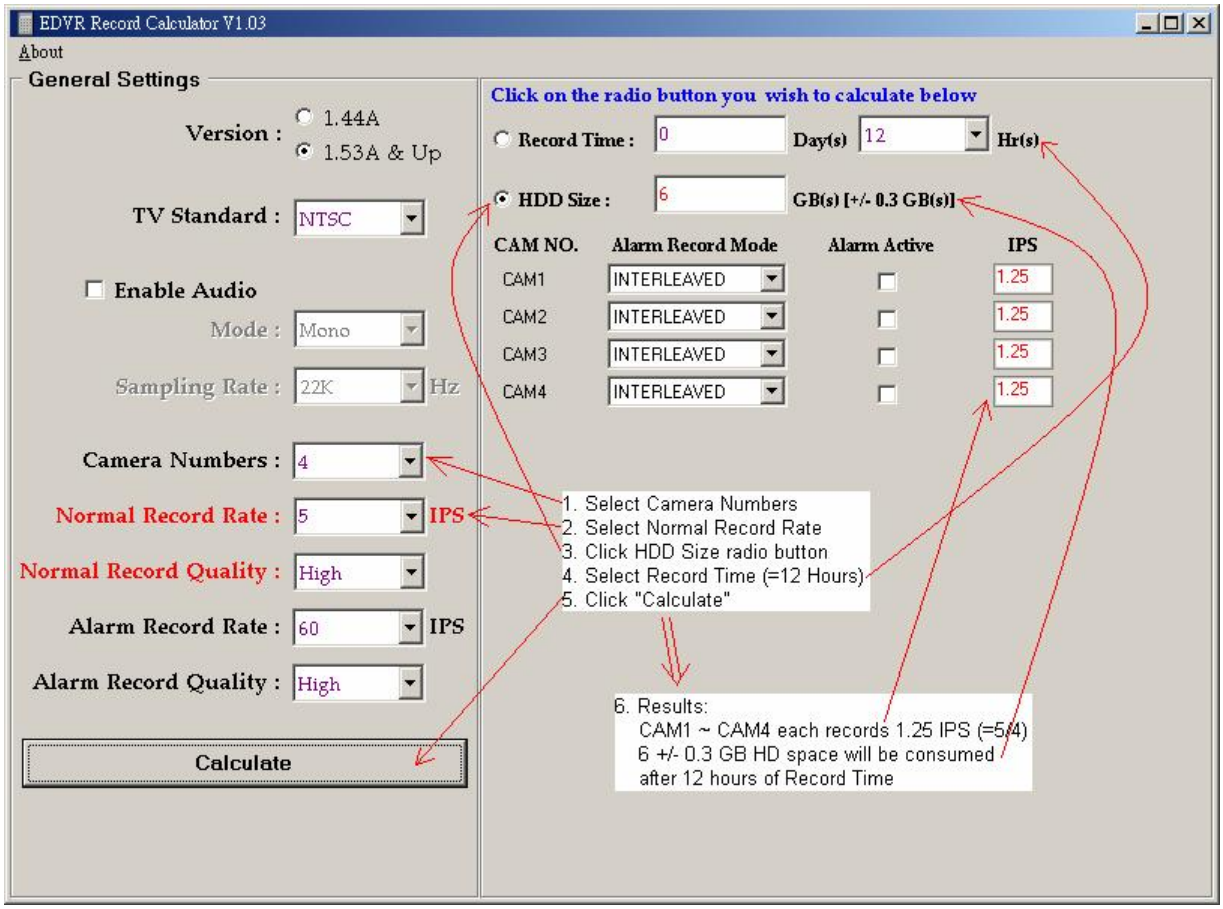
4. Compute HD space needed during 24 hours from steps 1–3 above:
   HD space = (6 + 3 + 3 +/- 0.7) GB
   = 12 +/- 0.7 GB

5. Compute recording time attainable on a 160 GB HD:
   Record Time = 160/12.7 to 160/11.3 Days
   = 12.6 to 14.16 Days
   = 13.38 +/- 0.78 Days

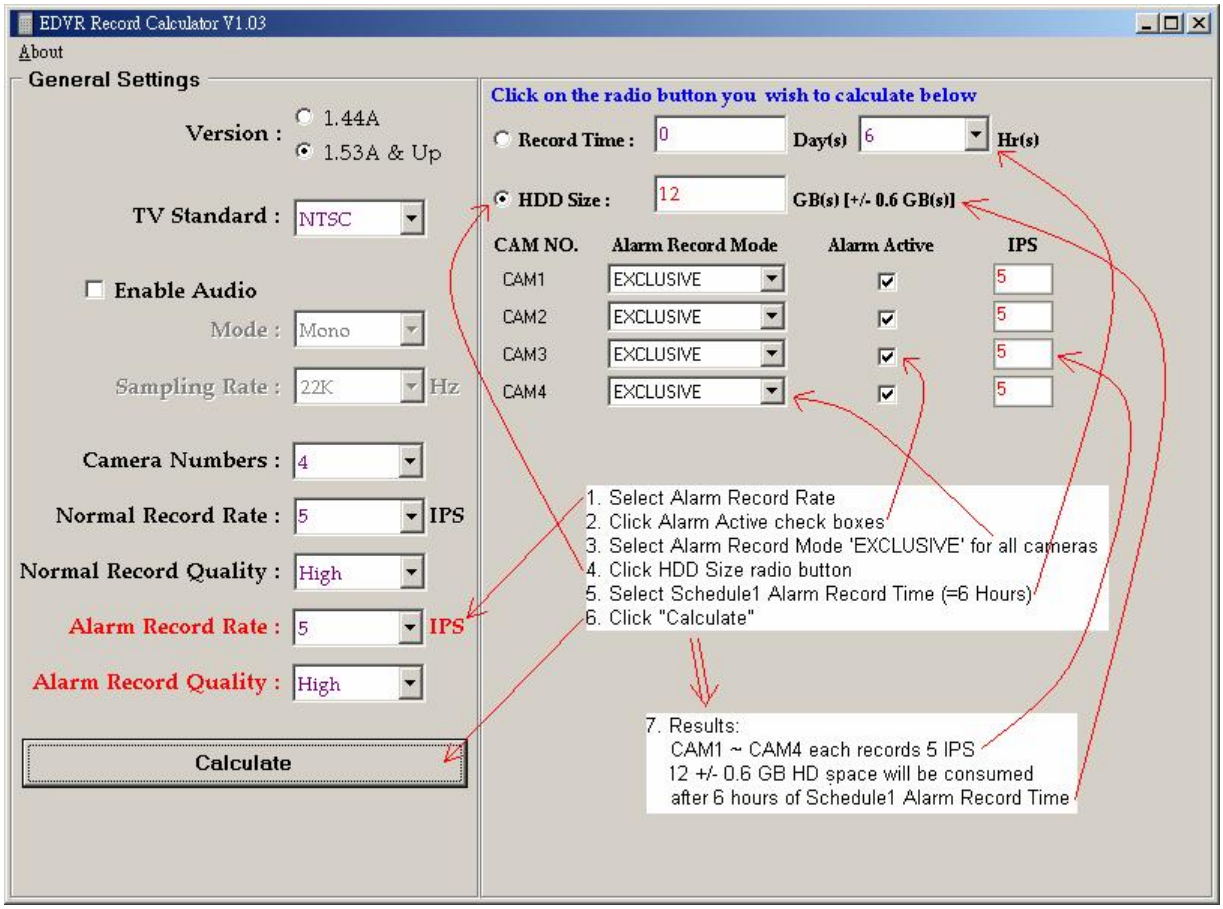
Example - Scenario 2

Everything is set up the same way as Scenario 1 except that Schedule1 alarms are all set to Exclusive mode. How do I do the calculation now?

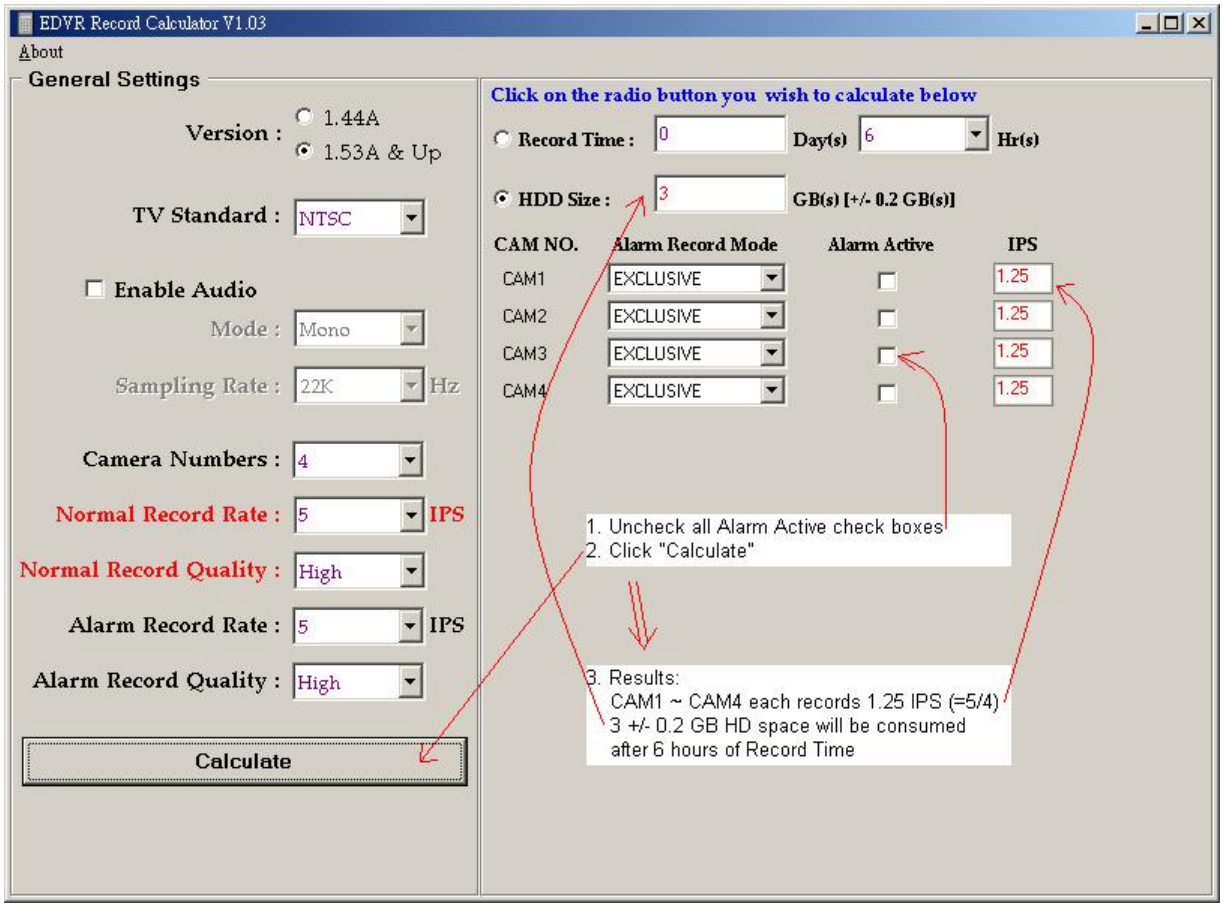
1. Normal Record Mode: Estimate HD space needed for 12 hours of normal recording.



2. Schedule1 Alarm Record Mode: Estimate HD space needed for 12 hours of alarm recording at 50% of the time, or 6 hours (continued from the last section).



3. Schedule1 Normal Record Mode: Estimate HD space needed for the other 50% of time (6 hours) when alarm is off (continued from the last section).



4. Compute HD space needed during 24 hours from steps 1–3 above:
   HD space = (6 + 12 + 3 +/- 1.1) GB
   = 21 +/- 1.1 GB

5. Compute recording time attainable on a 160 GB HD
   Record Time = 160/22.1 to 160/19.9 Days
   = 7.24 to 8.04 Days
   = 7.64 +/- 0.4 Days

3. Understanding Alarm Record Rate and Alarm Record Mode

Alarm Record Rate

Please see *4. Alarm Record Rate*, on page 48 of the EDVR Installation and Operation Guide v1.54 (or later). IOGs of earlier releases do not contain adequate information.

Alarm Record Mode

Please see *5. Alarm Record Mode*, on page 48 of the EDVR Installation and Operation Guide v1.54 (or later). IOGs of earlier releases do not contain adequate information.

4. The Computation Algorithm

Normal Record Mode

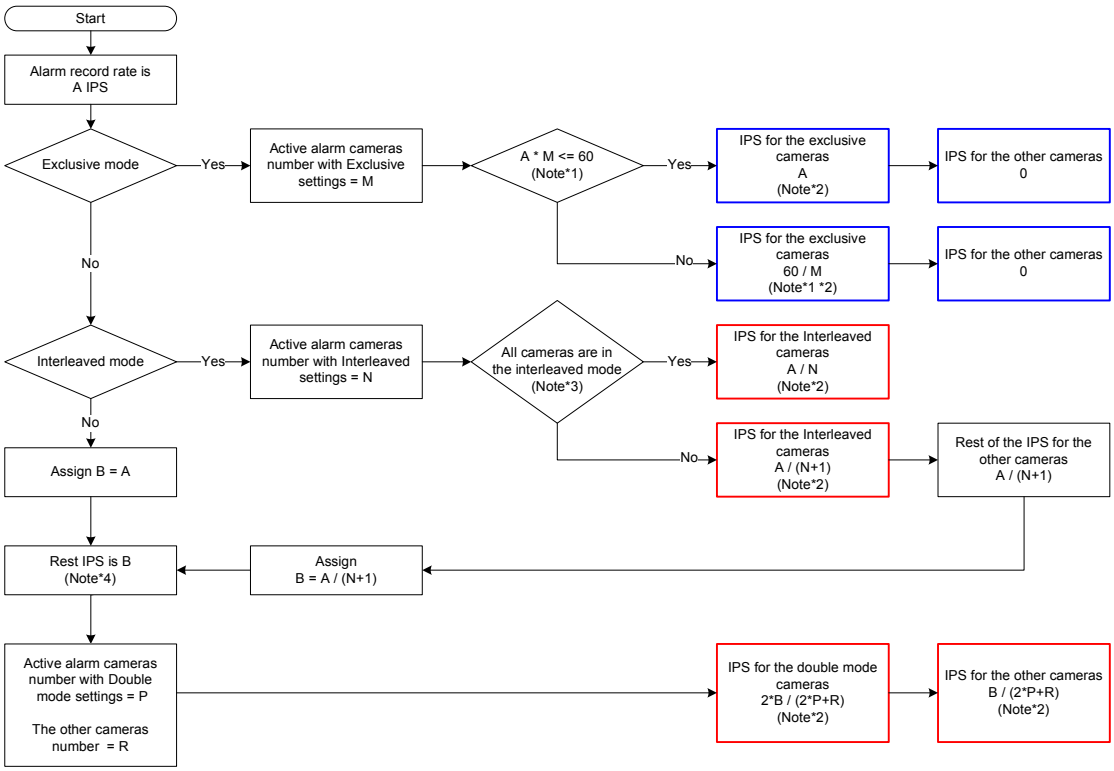
$$\text{(Record Rate Per Camera)} = \frac{\text{Normal Record Rate}}{\text{Total Cameras}}$$

Alarm Record Mode

Alarm Camera: Cameras are in the alarm state.
Non-Alarm Camera: Cameras are not in alarm state.

	Alarms Active	
Camera's Alarm Record Mode	Alarm Record Rate For Per Camera	Non-Alarm Record Rate For Per Camera
Normal Mode	**Camera Rate** = $\frac{\text{Alarm Record Rate}}{\text{Total Cameras}}$	**Camera Rate** = $\frac{\text{Alarm Record Rate}}{\text{Total Cameras}}$
Double Mode	**Camera Rate** = $\frac{\text{Alarm Record Rate*2}}{(2*\text{number of Alarm Cameras}) + \text{number of Non-Alarm Cameras}}$	**Camera Rate** = $\frac{\text{Alarm Record Rate}}{(2*\text{number of Alarm Cameras}) + \text{number of Non-Alarm Cameras}}$
Interleave Mode	1. When Number of Non-Alarm Cameras ≠ 0 **Camera Rate** = $\frac{\text{Alarm Record Rate}}{1+\text{Number of Alarm Cameras}}$ 2. When Number of Non-Alarm Cameras = 0 **Camera Rate** = $\frac{\text{Alarm Record Rate}}{\text{Number of Alarm Cameras}}$	**Camera Rate** = $\frac{\text{Alarm Record Rate}}{(1+\text{Number of Alarm Cameras}) * \text{Number of Non-Alarm Cameras}}$
Exclusive Mode	1. When Alarm Record Rate * Number of Alarm Cameras <= 60 **(NOTE 1.)** **Camera Rate** = Alarm Record Rate 2. When Alarm Record Rate * Number of Alarm Cameras > 60 **(NOTE 1.)** **Camera Rate** = $\frac{60 \text{ (NOTE 1.)}}{\text{Number of Alarm Cameras}}$	0

(NOTE 1. : NTSC uses 60 IPS, PAL uses 50 IPS)
(NOTE 2. : The maximum number of images a single channel can record is 30 IPS in the NTSC system and 25 IPS in the PAL system.)


Start
Alarm record rate is A IPS
Exclusive mode
Yes
Active alarm cameras number with Exclusive settings = M
A * M <= 60 (Note*1)
Yes
IPS for the exclusive cameras A (Note*2)
IPS for the other cameras 0
No
IPS for the exclusive cameras 60 / M (Note*1 *2)
IPS for the other cameras 0
No
Interleaved mode
Yes
Active alarm cameras number with Interleaved settings = N
All cameras are in the interleaved mode (Note*3)
Yes
IPS for the Interleaved cameras A / N (Note*2)
No
IPS for the Interleaved cameras A / (N+1) (Note*2)
Rest of the IPS for the other cameras A / (N+1)
No
Assign B = A
Rest IPS is B (Note*4)
Assign B = A / (N+1)
Active alarm cameras number with Double mode settings = P
The other cameras number = R
IPS for the double mode cameras 2*B / (2*P+R) (Note*2)
IPS for the other cameras B / (2*P+R) (Note*2)

Note *1 In the NTSC system, we use 60 IPS to judge. In the PAL system, we use 50 IPS to judge.
Note *2 The maximum record rate is up to 30 IPS at the NTSC system, and 25 IPS at the PAL system.
Note *3 All cameras are set in interleaved mode. And they are all alarm active.
Note *4 The B IPS will be A when there is no exclusive and interleaved cameras active.
It will be A/(N+1) after calculating the interleaved mode.

A: Alarm record rate
B: The rest of the IPS. The rate will be A when there are no exclusive and interleaved cameras active.
Or it will be A/(N+1) after calculating the interleaved mode.
M: The numbers of active alarm cameras with Exclusive settings.
N: The numbers of active alarm cameras with Interleaved settings.
P: The numbers of active alarm cameras with Double settings.
R: The numbers of the other cameras, including
The numbers of the active alarm cameras with Normal settings + the numbers of non-active alarm cameras

Example

System configuration is as below.
Alarm record rate = 60 IPS

Camera	Alarm mode	Alarm active	IPS
1	Interleaved	Yes	15
2	Interleaved	Yes	15
3	Interleaved	Yes	15
4	Interleaved	No	1.875
5	Double	Yes	3.75
6	Double	Yes	3.75
7	Double	No	1.875
8	Normal	Yes	1.875
9	Normal	No	1.875

1. Alarm record rate is 60 IPS. A = 60
2. Number of active alarm cameras is 3. N = 3
   We can calculate the IPS for cameras 1, 2, 3. The IPS is 60/(3+1) = 15
3. Rest IPS is B. B = A/(N+1) = 60/(3+1) = 15
4. Number of active alarm cameras with Double mode setting is 2. P = 2
5. Number of other cameras is 4. R = 4.
6. We can calculate the IPS for the double mode cameras 5 and 6.
   The IPS is 2*B/(2P+R) = 2*15/(2*2+4) = 3.75
7. We can calculate the IPS for the other cameras 4, 7, 8, 9.
8. The IPS is B/(2P+R)= 15/(2*2+4) = 1.875

5. Possible Recording Time Tables for EDVR v1.44A

The quality of each image will lead to a range of picture sizes, depending on the quality of the camera and the image content. The ranges are:

- BEST: 38K ~ 42K
- HIGH: 30K ~ 34K
- STANDARD: 22K ~ 26K
- BASIC: 14K ~ 18K

The center points of these ranges, 40K for BEST, 32K for HIGH, 24K for STANDARD and 16K for BASIC, are used to compute the estimation of recording period in the following tables.

Note

Depending on the picture content and the camera quality, a variation up to 5%, 6%, 8% and 12% for the four quality settings may be encountered in reality.

Recording Rate = 60 IPS

	Recording Rate = 60 IPS, Possible Recording Time (hour)						
Capacity	**HDD=40G**	**HDD=80G**	**HDD=100G**	**HDD=160G**	**HDD=200G**	**HDD=250G**	**HDD=300G**
Best	**4.6**	**9.3**	**11.6**	**18.5**	**23.2**	**28.9**	**34.7**
High	**5.8**	**11.6**	**14.5**	**23.2**	**28.9**	**36.2**	**43.4**
Standard	**7.7**	**15.4**	**19.3**	**30.9**	**38.6**	**48.2**	**57.9**
Basic	**11.6**	**23.2**	**28.9**	**46.3**	**57.9**	**72.3**	**86.8**
Best + Audio (8K)	**4.6**	**9.2**	**11.5**	**18.5**	**23.1**	**28.8**	**34.6**
High + Audio (8K)	**5.8**	**11.5**	**14.4**	**23.1**	**28.8**	**36.0**	**43.2**
Standard + Audio (8K)	**7.7**	**15.4**	**19.2**	**30.7**	**38.4**	**48.0**	**57.6**
Basic + Audio (8K)	**11.5**	**23.0**	**28.7**	**45.9**	**57.4**	**71.7**	**86.1**
Best + Audio (22K)	**4.6**	**9.2**	**11.5**	**18.4**	**22.9**	**28.7**	**34.4**
High + Audio (22K)	**5.7**	**11.4**	**14.3**	**22.9**	**28.6**	**35.8**	**42.9**
Standard + Audio (22K)	**7.6**	**15.2**	**19.0**	**30.4**	**38.0**	**47.5**	**57.0**
Basic + Audio (22K)	**11.3**	**22.6**	**28.3**	**45.3**	**56.6**	**70.7**	**84.9**
Best + Audio (44K)	**4.5**	**9.1**	**11.4**	**18.2**	**22.7**	**28.4**	**34.1**
High + Audio (44K)	**5.7**	**11.3**	**14.1**	**22.6**	**28.3**	**35.4**	**42.4**
Standard + Audio (44K)	**7.5**	**15.0**	**18.7**	**29.9**	**37.4**	**46.8**	**56.2**
Basic + Audio (44K)	**11.1**	**22.1**	**27.7**	**44.3**	**55.3**	**69.2**	**83.0**

Note

Must have 2 or more cameras to utilize the aggregate record rate over 30 IPS. Audio is based on MONO for this table. Audio in Stereo will lead to Record Time reduction ranging from <1% for Best + Audio (8K) to 5% for Basic + Audio (44K).

Recording Rate = 30 IPS

	Recording Rate = 30 IPS, Possible Recording Time (hour)						
Capacity	HDD=40G	HDD=80G	HDD=100G	HDD=160G	HDD=200G	HDD=250G	HDD=300G
Best	9.3	18.5	23.2	37.0	46.3	57.9	69.4
High	11.6	23.2	28.9	46.3	57.9	72.3	86.8
Standard	15.4	30.9	38.6	61.7	77.2	96.5	115.7
Basic	23.2	46.3	57.9	92.6	115.7	144.7	173.6
Best + Audio (8K)	9.2	18.4	23.0	36.8	46.0	57.5	69.0
High + Audio (8K)	11.5	23.0	28.7	45.9	57.4	71.7	86.1
Standard + Audio (8K)	15.3	30.5	38.7	61.1	76.3	95.4	114.5
Basic + Audio (8K)	22.8	45.5	56.9	91.1	113.8	142.3	170.8
Best + Audio (22K)	9.1	18.2	22.7	36.4	45.5	56.8	68.2
High + Audio (22K)	11.3	22.6	28.3	45.3	56.6	70.7	84.9
Standard + Audio (22K)	15.0	29.9	37.4	59.9	74.9	93.6	112.3
Basic + Audio (22K)	22.1	44.3	55.3	88.5	110.7	138.3	166.0
Best + Audio (44K)	8.9	17.9	22.3	35.7	44.7	55.8	67.0
High + Audio (44K)	11.1	22.1	27.7	44.3	55.3	69.2	83.0
Standard + Audio (44K)	14.5	29.1	36.4	58.2	72.7	90.9	109.1
Basic + Audio (44K)	21.2	42.4	53.0	84.8	106.0	132.5	159.0

Note

Audio is based on MONO for this table. Audio in Stereo will lead to Record Time reduction ranging from 1% for Best + Audio (8K) to 8% for Basic + Audio (44K)

Recording Rate = 1 IPS

	Recording Rate = 1 IPS, Possible Recording Time (hour)						
Capacity	HDD=40G	HDD=80G	HDD=100G	HDD=160G	HDD=200G	HDD=250G	HDD=300G
Best	277.8	555.6	694.4	1111.1	1388.9	1736.1	2083.3
High	347.2	694.4	868.1	1388.9	1736.1	2170.1	2604.2
Standard	463.0	925.9	1157.4	1851.9	2314.8	2893.5	3472.2
Basic	694.4	1388.9	1736.1	2777.8	3472.2	4340.3	5208.3
Best + Audio (8K)	231.5	463.0	578.7	925.9	1157.4	1446.8	1736.1
High + Audio (8K)	277.8	555.6	694.4	1111.1	1388.9	1736.1	2083.3
Standard + Audio (8K)	347.2	694.4	868.1	1388.9	1736.1	2170.1	2604.2
Basic + Audio (8K)	463.0	925.9	1157.4	1851.9	2314.8	2893.5	3472.2
Best + Audio (22K)	179.2	358.4	448.0	716.8	896.1	1120.1	1344.1
High + Audio (22K)	205.8	411.5	514.4	823.0	1028.8	1286.0	1543.2
Standard + Audio (22K)	241.5	483.1	603.9	966.2	1207.7	1509.7	1811.6
Basic + Audio (22K)	292.4	584.8	731.0	1169.6	1462.0	1827.5	2193.0
Best + Audio (44K)	132.3	264.6	330.7	529.1	661.4	826.7	992.1
High + Audio (44K)	146.2	292.4	365.5	584.8	731.0	913.7	1096.5
Standard + Audio (44K)	163.4	326.8	408.5	653.6	817.0	1021.2	1225.5
Basic + Audio (44K)	185.2	370.4	463.0	740.7	925.9	1157.4	1388.9

Note

Audio is based on MONO for this table. Audio in Stereo will lead to Record Time reduction ranging from 14% for Best + Audio (8K) to 42% for Basic + Audio (44K).

6. Possible Recording Time Tables for EDVR v1.53A and Later

The quality of each image will lead to a range of picture sizes, depending on the quality of the camera and the image content. The ranges are:

- BEST: 38K ~ 42K
- HIGH: 26K ~ 30K
- STANDARD: 14K ~ 18K
- BASIC: 8K ~ 14K

The center points of these ranges, 40K for BEST, 28K for HIGH, 16K for STANDARD and 11K for BASIC, are used to compute the estimation of recording period in the following tables.

Note

Depending on the picture content and the camera quality, a variation up to 5%, 7%, 12% and 27% for the four quality settings may be encountered in reality.

Recording Rate = 60 IPS

	Recording Rate = 60 field/sec, Possible Recording Time (hour)						
Capacity	**HDD=40G**	**HDD=80G**	**HDD=100G**	**HDD=160G**	**HDD=200G**	**HDD=250G**	**HDD=300G**
Best	**4.6**	**9.3**	**11.6**	**18.5**	**23.2**	**28.9**	**34.7**
High	**6.6**	**13.2**	**16.5**	**26.5**	**33.1**	**41.3**	**49.6**
Standard	**11.6**	**23.2**	**28.9**	**46.3**	**57.9**	**72.3**	**86.8**
Basic	**16.8**	**33.7**	**42.1**	**67.3**	**84.2**	**105.2**	**126.2**
Best + Audio (8K)	**4.6**	**9.2**	**11.5**	**18.5**	**23.1**	**28.8**	**34.6**
High + Audio (8K)	**6.6**	**13.2**	**16.5**	**26.3**	**32.9**	**41.1**	**49.4**
Standard + Audio (8K)	**11.5**	**23.0**	**28.7**	**45.9**	**57.4**	**71.7**	**86.1**
Basic + Audio (8K)	**16.6**	**33.3**	**41.6**	**66.5**	**83.2**	**103.9**	**124.7**
Best + Audio (22K)	**4.6**	**9.2**	**11.5**	**18.4**	**22.9**	**28.7**	**34.4**
High + Audio (22K)	**6.5**	**13.1**	**16.3**	**26.1**	**32.6**	**40.8**	**49.0**
Standard + Audio (22K)	**11.3**	**22.6**	**28.3**	**45.3**	**56.6**	**70.7**	**84.9**
Basic + Audio (22K)	**16.3**	**32.6**	**40.7**	**65.2**	**81.5**	**101.8**	**122.2**
Best + Audio (44K)	**4.6**	**9.1**	**11.4**	**18.2**	**22.7**	**28.4**	**34.1**
High + Audio (44K)	**6.5**	**12.9**	**16.1**	**25.8**	**32.3**	**40.3**	**48.4**
Standard + Audio (44K)	**11.1**	**22.1**	**27.7**	**44.3**	**55.3**	**69.2**	**83.0**
Basic + Audio (44K)	**15.8**	**31.6**	**39.5**	**63.1**	**78.9**	**98.6**	**118.4**

Note

Must have 2 or more cameras to utilize the aggregate record rate over 30 IPS. Audio is based on MONO for this table. Audio in Stereo will lead to Record Time reduction ranging from <1% for Best + Audio (8K) to 6% for Basic + Audio (44K).

Recording Rate = 30 IPS

	Recording Rate = 30 field/sec, Possible Recording Time (hour)						
Capacity	HDD=40G	HDD=80G	HDD=100G	HDD=160G	HDD=200G	HDD=250G	HDD=300G
Best	9.3	18.5	23.2	37.0	46.3	57.9	69.4
High	13.2	26.5	33.1	52.9	66.1	82.7	99.2
Standard	23.2	46.3	57.9	92.6	115.7	144.7	173.6
Basic	33.7	67.3	84.2	134.7	168.4	210.4	252.5
Best + Audio (8K)	9.2	18.4	23.0	36.8	46.0	57.5	69.0
High + Audio (8K)	13.1	26.2	32.8	52.4	65.5	81.9	98.3
Standard + Audio (8K)	22.8	45.5	56.9	91.1	113.8	142.3	170.8
Basic + Audio (8K)	32.9	65.7	82.2	131.5	164.4	205.4	246.5
Best + Audio (22K)	9.1	18.2	22.7	36.4	45.5	56.8	68.2
High + Audio (22K)	12.9	25.8	32.2	51.6	64.4	80.6	96.7
Standard + Audio (22K)	22.1	44.3	55.3	88.5	110.7	138.3	166.0
Basic + Audio (22K)	31.6	63.1	78.9	126.3	157.8	197.3	236.7
Best + Audio (44K)	8.9	17.9	22.3	35.7	44.7	55.8	67.0
High + Audio (44K)	12.6	25.1	31.4	50.3	62.8	78.6	94.3
Standard + Audio (44K)	21.2	42.4	53.0	84.8	106.0	132.5	159.0
Basic + Audio (44K)	29.7	59.4	74.3	118.8	148.5	185.7	222.8

Note

Audio is based on MONO for this table. Audio in Stereo will lead to Record Time reduction ranging from 1% for Best + Audio (8K) to 10% for Basic + Audio (44K).

Recording Rate = 1 IPS

	Recording Rate = 1 field/sec, Possible Recording Time (hour)						
Capacity	HDD=40G	HDD=80G	HDD=100G	HDD=160G	HDD=200G	HDD=250G	HDD=300G
Best	277.8	555.6	694.4	1111.1	1388.9	1736.1	2083.3
High	396.8	793.7	992.1	1587.3	1984.1	2480.2	2976.2
Standard	694.4	1388.9	1736.1	2777.8	3472.2	4340.3	5208.3
Basic	1010.1	2020.2	2525.3	4040.4	5050.5	6313.1	7575.8
Best + Audio (8K)	231.5	463.0	578.7	925.9	1157.4	1446.8	1736.1
High + Audio (8K)	308.6	617.3	771.6	1234.6	1543.2	1929.0	2314.8
Standard + Audio (8K)	463.0	925.9	1157.4	1851.9	2314.8	2893.5	3472.2
Basic + Audio (8K)	584.8	1169.6	1462.0	2339.2	2924.0	3654.9	4385.9
Best + Audio (22K)	179.2	358.4	448.0	716.9	896.1	1120.1	1344.1
High + Audio (22K)	222.2	444.4	555.6	888.9	1111.1	1388.9	1666.7
Standard + Audio (22K)	292.4	584.8	731.0	1169.6	1462.0	1827.5	2193.0
Basic + Audio (22K)	336.7	673.4	841.8	1346.8	1683.5	2104.4	2525.3
Best + Audio (44K)	132.3	264.6	330.7	529.1	661.4	826.7	992.1
High + Audio (44K)	154.3	308.0	385.8	617.3	771.6	964.5	1157.4
Standard + Audio (44K)	185.2	370.4	463.0	740.7	925.9	1157.4	1388.9
Basic + Audio (44K)	202.0	404.0	505.1	808.1	1010.1	1262.6	1515.2

Note

Audio is based on MONO for this table. Audio in Stereo will lead to Record Time reduction ranging from 14% for Best + Audio (8K) to 44% for Basic + Audio (44K).